MEAN SOLAR INTO SIDEREAL TIME

m	0 h m s	1 h m s	2 h m s	3 h m s	4 h m s	5 h m s	6 h m s	7 h m s	8 h m s	9 h m s	10 h m s	11 h m s	12 h m s	13 h m s	14 h m s	15 h m s	16 h m s	17 h m s	18 h m s	19 h m s	20 h m s	21 h m s	22 h m s
0	0 0.0	0 9.9	0 19.7	0 29.6	0 39.4	0 49.3	0 59.1	1 9.0	1 18.9	1 28.7	1 38.6	1 48.4	1 58.3	2 8.1	2 18.0	2 37.7	2 47.6	2 57.4	3 7.3	3 17.1	3 27.0	3 36.8	3 46.7
1	0 0.2	0 10.0	0 19.9	0 29.7	0 39.6	0 49.4	0 59.3	1 9.2	1 19.0	1 28.9	1 38.7	1 48.6	1 58.4	2 8.3	2 18.2	2 37.9	2 47.7	2 57.6	3 7.4	3 17.3	3 27.2	3 37.0	3 46.9
2	0 0.3	0 10.2	0 20.0	0 29.9	0 39.8	0 49.6	0 59.5	1 9.3	1 19.2	1 29.0	1 38.9	1 48.8	1 58.6	2 8.5	2 18.3	2 38.0	2 47.9	2 57.7	3 7.6	3 17.5	3 27.3	3 37.2	3 47.0
3	0 0.5	0 10.3	0 20.2	0 30.1	0 39.9	0 49.8	0 59.6	1 9.5	1 19.3	1 29.2	1 39.1	1 48.9	1 58.8	2 8.6	2 18.5	2 38.2	2 48.1	2 57.9	3 7.8	3 17.6	3 27.5	3 37.3	3 47.2
4	0 0.7	0 10.5	0 20.4	0 30.2	0 40.1	0 49.9	0 59.8	1 9.7	1 19.5	1 29.4	1 39.2	1 49.1	1 58.9	2 8.8	2 18.6	2 38.4	2 48.2	2 58.1	3 7.9	3 17.8	3 27.6	3 37.5	3 47.4
5	0 0.8	0 10.7	0 20.5	0 30.4	0 40.2	0 50.1	0 60.0	1 9.8	1 19.7	1 29.5	1 39.4	1 49.2	1 59.1	2 9.0	2 18.8	2 38.5	2 48.4	2 58.2	3 8.1	3 18.0	3 27.8	3 37.7	3 47.5
6	0 1.0	0 10.8	0 20.7	0 30.6	0 40.4	0 50.3	1 0.1	1 10.0	1 19.8	1 29.7	1 39.6	1 49.4	1 59.3	2 9.1	2 19.0	2 38.7	2 48.5	2 58.4	3 8.3	3 18.1	3 28.0	3 37.8	3 47.7
7	0 1.1	0 11.0	0 20.9	0 30.7	0 40.6	0 50.4	1 0.3	1 10.1	1 20.0	1 29.9	1 39.7	1 49.6	1 59.4	2 9.3	2 19.1	2 38.9	2 48.7	2 58.6	3 8.4	3 18.3	3 28.1	3 38.0	3 47.8
8	0 1.3	0 11.2	0 21.0	0 30.9	0 40.7	0 50.6	1 0.5	1 10.3	1 20.2	1 30.0	1 39.9	1 49.7	1 59.6	2 9.4	2 19.3	2 39.0	2 48.9	2 58.7	3 8.6	3 18.4	3 28.3	3 38.2	3 48.0
9	0 1.5	0 11.3	0 21.2	0 31.0	0 40.9	0 50.8	1 0.6	1 10.5	1 20.3	1 30.2	1 40.0	1 49.9	1 59.8	2 9.6	2 19.5	2 39.2	2 49.0	2 58.9	3 8.8	3 18.6	3 28.5	3 38.3	3 48.2
10	0 1.6	0 11.5	0 21.4	0 31.2	0 41.1	0 50.9	1 0.8	1 10.6	1 20.5	1 30.4	1 40.2	1 50.1	1 59.9	2 9.8	2 19.6	2 39.3	2 49.2	2 59.1	3 8.9	3 18.8	3 28.6	3 38.5	3 48.3
11	0 1.8	0 11.7	0 21.5	0 31.4	0 41.2	0 51.1	1 0.9	1 10.8	1 20.7	1 30.5	1 40.4	1 50.2	2 0.1	2 9.9	2 19.8	2 39.5	2 49.4	2 59.2	3 9.1	3 18.9	3 28.8	3 38.7	3 48.5
12	0 2.0	0 11.8	0 21.7	0 31.5	0 41.4	0 51.3	1 1.1	1 11.0	1 20.8	1 30.7	1 40.5	1 50.4	2 0.2	2 10.1	2 20.0	2 39.7	2 49.5	2 59.4	3 9.2	3 19.1	3 29.0	3 38.8	3 48.7
13	0 2.1	0 12.0	0 21.8	0 31.7	0 41.6	0 51.4	1 1.3	1 11.1	1 21.0	1 30.8	1 40.7	1 50.6	2 0.4	2 10.3	2 20.1	2 39.8	2 49.7	2 59.6	3 9.4	3 19.3	3 29.1	3 39.0	3 48.8
14	0 2.3	0 12.2	0 22.0	0 31.9	0 41.7	0 51.6	1 1.4	1 11.3	1 21.2	1 31.0	1 40.9	1 50.7	2 0.6	2 10.4	2 20.3	2 40.0	2 49.9	2 59.7	3 9.6	3 19.4	3 29.3	3 39.1	3 49.0
15	0 2.5	0 12.3	0 22.2	0 32.0	0 41.9	0 51.7	1 1.6	1 11.5	1 21.3	1 31.2	1 41.0	1 50.9	2 0.7	2 10.6	2 20.5	2 40.2	2 50.0	2 59.9	3 9.7	3 19.6	3 29.5	3 39.3	3 49.2
16	0 2.6	0 12.5	0 22.3	0 32.2	0 42.1	0 51.9	1 1.8	1 11.6	1 21.5	1 31.3	1 41.2	1 51.0	2 0.9	2 10.8	2 20.6	2 40.3	2 50.2	3 0.0	3 9.9	3 19.8	3 29.6	3 39.5	3 49.3
17	0 2.8	0 12.6	0 22.5	0 32.4	0 42.2	0 52.1	1 1.9	1 11.8	1 21.6	1 31.5	1 41.4	1 51.2	2 1.1	2 10.9	2 20.8	2 40.5	2 50.4	3 0.2	3 10.1	3 19.9	3 29.8	3 39.6	3 49.5
18	0 3.0	0 12.8	0 22.7	0 32.5	0 42.4	0 52.2	1 2.1	1 12.0	1 21.8	1 31.7	1 41.5	1 51.4	2 1.2	2 11.1	2 20.9	2 40.7	2 50.5	3 0.4	3 10.2	3 20.1	3 29.9	3 39.8	3 49.7
19	0 3.1	0 13.0	0 22.8	0 32.7	0 42.5	0 52.4	1 2.3	1 12.1	1 22.0	1 31.8	1 41.7	1 51.5	2 1.4	2 11.3	2 21.1	2 40.8	2 50.7	3 0.5	3 10.4	3 20.3	3 30.1	3 40.0	3 49.8
20	0 3.3	0 13.1	0 23.0	0 32.9	0 42.7	0 52.6	1 2.4	1 12.3	1 22.1	1 32.0	1 41.9	1 51.7	2 1.6	2 11.4	2 21.3	2 41.0	2 50.8	3 0.7	3 10.6	3 20.4	3 30.3	3 40.1	3 50.0
21	0 3.4	0 13.3	0 23.2	0 33.0	0 42.9	0 52.7	1 2.6	1 12.4	1 22.3	1 32.2	1 42.0	1 51.9	2 1.7	2 11.6	2 21.4	2 41.2	2 51.0	3 0.9	3 10.7	3 20.6	3 30.4	3 40.3	3 50.1
22	0 3.6	0 13.5	0 23.3	0 33.2	0 43.0	0 52.9	1 2.8	1 12.6	1 22.5	1 32.3	1 42.2	1 52.0	2 1.9	2 11.7	2 21.6	2 41.3	2 51.2	3 1.0	3 10.9	3 20.7	3 30.6	3 40.5	3 50.3
23	0 3.8	0 13.6	0 23.5	0 33.3	0 43.2	0 53.1	1 2.9	1 12.8	1 22.6	1 32.5	1 42.3	1 52.2	2 2.1	2 11.9	2 21.8	2 41.5	2 51.3	3 1.2	3 11.1	3 20.9	3 30.8	3 40.6	3 50.5
24	0 3.9	0 13.8	0 23.7	0 33.5	0 43.4	0 53.2	1 3.1	1 12.9	1 22.8	1 32.7	1 42.5	1 52.4	2 2.2	2 12.1	2 21.9	2 41.6	2 51.5	3 1.4	3 11.2	3 21.1	3 30.9	3 40.8	3 50.6
25	0 4.1	0 14.0	0 23.8	0 33.7	0 43.5	0 53.4	1 3.2	1 13.1	1 23.0	1 32.8	1 42.7	1 52.5	2 2.4	2 12.2	2 22.1	2 41.8	2 51.7	3 1.5	3 11.4	3 21.2	3 31.1	3 40.9	3 50.8
26	0 4.3	0 14.1	0 24.0	0 33.8	0 43.7	0 53.6	1 3.4	1 13.3	1 23.1	1 33.0	1 42.8	1 52.7	2 2.5	2 12.4	2 22.3	2 42.0	2 51.8	3 1.7	3 11.5	3 21.4	3 31.3	3 41.1	3 51.0
27	0 4.4	0 14.3	0 24.1	0 34.0	0 43.9	0 53.7	1 3.6	1 13.4	1 23.3	1 33.1	1 43.0	1 52.9	2 2.7	2 12.6	2 22.4	2 42.1	2 52.0	3 1.9	3 11.7	3 21.6	3 31.4	3 41.3	3 51.1
28	0 4.6	0 14.5	0 24.3	0 34.2	0 44.0	0 53.9	1 3.7	1 13.6	1 23.5	1 33.3	1 43.2	1 53.0	2 2.9	2 12.7	2 22.6	2 42.3	2 52.2	3 2.0	3 11.9	3 21.7	3 31.6	3 41.4	3 51.3
29	0 4.8	0 14.6	0 24.5	0 34.3	0 44.2	0 54.0	1 3.9	1 13.8	1 23.6	1 33.5	1 43.3	1 53.2	2 3.0	2 12.9	2 22.8	2 42.5	2 52.3	3 2.2	3 12.0	3 21.9	3 31.8	3 41.6	3 51.5

MEAN SOLAR INTO SIDEREAL TIME

m	0 h	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h	11 h	12 h	13 h	14 h	15 h	16 h	17 h	18 h	19 h	20 h	21 h	22 h
	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s
30	0 4.9	0 14.8	0 24.6	0 34.5	0 44.4	0 54.2	1 4.1	1 13.9	1 23.8	1 33.6	1 43.5	1 53.3	2 3.2	2 13.1	2 22.9	2 42.6	2 52.5	3 2.3	3 12.2	3 22.1	3 31.9	3 41.8	3 51.6
31	0 5.1	0 14.9	0 24.8	0 34.7	0 44.5	0 54.4	1 4.2	1 14.1	1 23.9	1 33.8	1 43.7	1 53.5	2 3.4	2 13.2	2 23.1	2 42.8	2 52.7	3 2.5	3 12.4	3 22.2	3 32.1	3 41.9	3 51.8
32	0 5.3	0 15.1	0 25.0	0 34.8	0 44.7	0 54.5	1 4.4	1 14.3	1 24.1	1 34.0	1 43.8	1 53.7	2 3.5	2 13.4	2 23.2	2 43.0	2 52.8	3 2.7	3 12.5	3 22.4	3 32.2	3 42.1	3 52.0
33	0 5.4	0 15.3	0 25.1	0 35.0	0 44.8	0 54.7	1 4.6	1 14.4	1 24.3	1 34.1	1 44.0	1 53.8	2 3.7	2 13.6	2 23.4	2 43.1	2 53.0	3 2.8	3 12.7	3 22.6	3 32.4	3 42.3	3 52.1
34	0 5.6	0 15.4	0 25.3	0 35.2	0 45.0	0 54.9	1 4.7	1 14.6	1 24.4	1 34.3	1 44.2	1 54.0	2 3.9	2 13.7	2 23.6	2 43.3	2 53.1	3 3.0	3 12.9	3 22.7	3 32.6	3 42.4	3 52.3
35	0 5.7	0 15.6	0 25.5	0 35.3	0 45.2	0 55.0	1 4.9	1 14.7	1 24.6	1 34.5	1 44.3	1 54.2	2 4.0	2 13.9	2 23.7	2 43.5	2 53.3	3 3.2	3 13.0	3 22.9	3 32.7	3 42.6	3 52.4
36	0 5.9	0 15.8	0 25.6	0 35.5	0 45.3	0 55.2	1 5.1	1 14.9	1 24.8	1 34.6	1 44.5	1 54.3	2 4.2	2 14.0	2 23.9	2 43.6	2 53.5	3 3.3	3 13.2	3 23.0	3 32.9	3 42.8	3 52.6
37	0 6.1	0 15.9	0 25.8	0 35.6	0 45.5	0 55.4	1 5.2	1 15.1	1 24.9	1 34.8	1 44.6	1 54.5	2 4.4	2 14.2	2 24.1	2 43.8	2 53.6	3 3.5	3 13.4	3 23.2	3 33.1	3 42.9	3 52.8
38	0 6.2	0 16.1	0 26.0	0 35.8	0 45.7	0 55.5	1 5.4	1 15.2	1 25.1	1 35.0	1 44.8	1 54.7	2 4.5	2 14.4	2 24.2	2 43.9	2 53.8	3 3.7	3 13.5	3 23.4	3 33.2	3 43.1	3 52.9
39	0 6.4	0 16.3	0 26.1	0 36.0	0 45.8	0 55.7	1 5.5	1 15.4	1 25.3	1 35.1	1 45.0	1 54.8	2 4.7	2 14.5	2 24.4	2 44.1	2 54.0	3 3.8	3 13.7	3 23.5	3 33.4	3 43.2	3 53.1
40	0 6.6	0 16.4	0 26.3	0 36.1	0 46.0	0 55.9	1 5.7	1 15.6	1 25.4	1 35.3	1 45.1	1 55.0	2 4.8	2 14.7	2 24.6	2 44.3	2 54.1	3 4.0	3 13.8	3 23.7	3 33.6	3 43.4	3 53.3
41	0 6.7	0 16.6	0 26.4	0 36.3	0 46.2	0 56.0	1 5.9	1 15.7	1 25.6	1 35.4	1 45.3	1 55.2	2 5.0	2 14.9	2 24.7	2 44.4	2 54.3	3 4.2	3 14.0	3 23.9	3 33.7	3 43.6	3 53.4
42	0 6.9	0 16.8	0 26.6	0 36.5	0 46.3	0 56.2	1 6.0	1 15.9	1 25.8	1 35.6	1 45.5	1 55.3	2 5.2	2 15.0	2 24.9	2 44.6	2 54.5	3 4.3	3 14.2	3 24.0	3 33.9	3 43.7	3 53.6
43	0 7.1	0 16.9	0 26.8	0 36.6	0 46.5	0 56.3	1 6.2	1 16.1	1 25.9	1 35.8	1 45.6	1 55.5	2 5.3	2 15.2	2 25.1	2 44.8	2 54.6	3 4.5	3 14.3	3 24.2	3 34.1	3 43.9	3 53.8
44	0 7.2	0 17.1	0 26.9	0 36.8	0 46.7	0 56.5	1 6.4	1 16.2	1 26.1	1 35.9	1 45.8	1 55.6	2 5.5	2 15.4	2 25.2	2 44.9	2 54.8	3 4.6	3 14.5	3 24.4	3 34.2	3 44.1	3 53.9
45	0 7.4	0 17.2	0 27.1	0 37.0	0 46.8	0 56.7	1 6.5	1 16.4	1 26.2	1 36.1	1 46.0	1 55.8	2 5.7	2 15.5	2 25.4	2 45.1	2 55.0	3 4.8	3 14.7	3 24.5	3 34.4	3 44.2	3 54.1
46	0 7.6	0 17.4	0 27.3	0 37.1	0 47.0	0 56.8	1 6.7	1 16.6	1 26.4	1 36.3	1 46.1	1 56.0	2 5.8	2 15.7	2 25.5	2 45.3	2 55.1	3 5.0	3 14.8	3 24.7	3 34.5	3 44.4	3 54.3
47	0 7.7	0 17.6	0 27.4	0 37.3	0 47.1	0 57.0	1 6.9	1 16.7	1 26.6	1 36.4	1 46.3	1 56.1	2 6.0	2 15.9	2 25.7	2 45.4	2 55.3	3 5.1	3 15.0	3 24.9	3 34.7	3 44.6	3 54.4
48	0 7.9	0 17.7	0 27.6	0 37.5	0 47.3	0 57.2	1 7.0	1 16.9	1 26.7	1 36.6	1 46.5	1 56.3	2 6.2	2 16.0	2 25.9	2 45.6	2 55.4	3 5.3	3 15.2	3 25.0	3 34.9	3 44.7	3 54.6
49	0 8.0	0 17.9	0 27.8	0 37.6	0 47.5	0 57.3	1 7.2	1 17.0	1 26.9	1 36.8	1 46.6	1 56.5	2 6.3	2 16.2	2 26.0	2 45.8	2 55.6	3 5.5	3 15.3	3 25.2	3 35.0	3 44.9	3 54.7
50	0 8.2	0 18.1	0 27.9	0 37.8	0 47.6	0 57.5	1 7.4	1 17.2	1 27.1	1 36.9	1 46.8	1 56.6	2 6.5	2 16.3	2 26.2	2 45.9	2 55.8	3 5.6	3 15.5	3 25.3	3 35.2	3 45.1	3 54.9
51	0 8.4	0 18.2	0 28.1	0 37.9	0 47.8	0 57.7	1 7.5	1 17.4	1 27.2	1 37.1	1 46.9	1 56.8	2 6.7	2 16.5	2 26.4	2 46.1	2 55.9	3 5.8	3 15.7	3 25.5	3 35.4	3 45.2	3 55.1
52	0 8.5	0 18.4	0 28.3	0 38.1	0 48.0	0 57.8	1 7.7	1 17.5	1 27.4	1 37.3	1 47.1	1 57.0	2 6.8	2 16.7	2 26.5	2 46.2	2 56.1	3 6.0	3 15.8	3 25.7	3 35.5	3 45.4	3 55.2
53	0 8.7	0 18.6	0 28.4	0 38.3	0 48.1	0 58.0	1 7.8	1 17.7	1 27.6	1 37.4	1 47.3	1 57.1	2 7.0	2 16.8	2 26.7	2 46.4	2 56.3	3 6.1	3 16.0	3 25.8	3 35.7	3 45.5	3 55.4
54	0 8.9	0 18.7	0 28.6	0 38.4	0 48.3	0 58.2	1 8.0	1 17.9	1 27.7	1 37.6	1 47.4	1 57.3	2 7.1	2 17.0	2 26.9	2 46.6	2 56.4	3 6.3	3 16.1	3 26.0	3 35.9	3 45.7	3 55.6
55	0 9.0	0 18.9	0 28.7	0 38.6	0 48.5	0 58.3	1 8.2	1 18.0	1 27.9	1 37.7	1 47.6	1 57.5	2 7.3	2 17.2	2 27.0	2 46.7	2 56.6	3 6.5	3 16.3	3 26.2	3 36.0	3 45.9	3 55.7
56	0 9.2	0 19.1	0 28.9	0 38.8	0 48.6	0 58.5	1 8.3	1 18.2	1 28.1	1 37.9	1 47.8	1 57.6	2 7.5	2 17.3	2 27.2	2 46.9	2 56.8	3 6.6	3 16.5	3 26.3	3 36.2	3 46.0	3 55.9
57	0 9.4	0 19.2	0 29.1	0 38.9	0 48.8	0 58.6	1 8.5	1 18.4	1 28.2	1 38.1	1 47.9	1 57.8	2 7.6	2 17.5	2 27.4	2 47.1	2 56.9	3 6.8	3 16.6	3 26.5	3 36.4	3 46.2	3 56.1
58	0 9.5	0 19.4	0 29.2	0 39.1	0 49.0	0 58.8	1 8.7	1 18.5	1 28.4	1 38.2	1 48.1	1 57.9	2 7.8	2 17.7	2 27.5	2 47.2	2 57.1	3 6.9	3 16.8	3 26.7	3 36.5	3 46.4	3 56.2
59	0 9.7	0 19.5	0 29.4	0 39.3	0 49.1	0 59.0	1 8.8	1 18.7	1 28.5	1 38.4	1 48.3	1 58.1	2 8.0	2 17.8	2 27.7	2 47.4	2 57.3	3 7.1	3 17.0	3 26.8	3 36.7	3 46.5	3 56.4